



PATENT
740756-1915

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT application of:

Shunpei YAMAZAKI et al.

Application No.: 09/233,145

Filed: January 19, 1999

For: ACTIVE MATRIX DISPLAY DEVICE

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)
) Art Unit: 2871

) Examiner: DUONG, Tai

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on 4/2/02

April 2, 2002

AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the Examiner's non-Final Office Action mailed January 2, 2002, please consider the following amendments and remarks in connection with the above-identified application.

IN THE CLAIMS:

Please amend claims 56-65 to read as follows.

56. (Twice Amended) A display device comprising:

- at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof;
- an insulating film comprising an inorganic material formed over said semiconductor film;
- a first contact hole in said insulating film;
- a wiring formed on said insulating film and electrically connected to said semiconductor film through said first contact hole formed in said insulating film;
- a leveling film comprising an organic resin to provide a leveled upper surface over said semiconductor film;
- a second contact hole through said leveling film and said insulating film; and

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a leveling film comprising an organic resin to provide a leveled upper surface over said semiconductor film;

a second contact hole through said leveling film and said insulating film; and

a pixel electrode formed over said leveled upper surface and directly connected to said semiconductor film through said second contact hole,

wherein an edge of said leveling film at a periphery of said second contact hole is rounded,

wherein a surface of said pixel electrode is conformal to the rounded edge of said leveling film at said second contact hole.

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57. (Twice Amended) A display device comprising:

at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof and a gate electrode adjacent to said semiconductor film with a gate insulating film interposed therebetween;

an insulating film comprising an inorganic material formed over said semiconductor film;

a wiring formed on said insulating film and electrically connected to said semiconductor film through a contact hole formed in said insulating film;

a leveling film comprising an organic resin provided over said semiconductor film, said insulating film and said wiring;

an opening through said leveling film and said insulating film; and

a pixel electrode formed over said leveling film and directly connected to said semiconductor film through said opening,

wherein a diameter of said opening is larger at an uppermost surface of said leveling film than at a lowermost surface thereof.

58. (Twice Amended) A display device comprising:

at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof;

an insulating film over said semiconductor film, said insulating film comprising an inorganic material;

a leveling film comprising an organic resin formed over said insulating film;
and

a pixel electrode formed over said leveling film and directly connected to said semiconductor film through an opening provided in said leveling film,

wherein an edge of said organic resin film at a periphery of said opening is rounded,

wherein a surface of said pixel electrode is conformal to the rounded edge of said leveling film at said opening.

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59. (Twice Amended) A display device comprising:

a plurality of thin film transistors formed over a substrate, each of said thin film transistors comprising at least a semiconductor film and a gate electrode adjacent to said semiconductor film with a gate insulating film interposed therebetween;

an insulating film formed over said semiconductor film, said insulating film comprising an inorganic material;

a first opening formed in said insulating film over said semiconductor film;

a leveling layer formed over said insulating film to provide a leveled upper surface, wherein said leveling layer comprises an organic resin and is prevented from directly contacting said semiconductor film by said insulating film;

a second opening through said leveling layer and said insulating film over said semiconductor film; and

a pixel electrode formed over said leveled upper surface, said pixel electrode being directly connected to said semiconductor film through said second opening.

60. (Twice Amended) A display device comprising:

at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof and a gate electrode adjacent to said semiconductor film with a gate insulating film interposed therebetween;

an insulating film comprising an inorganic material formed over said semiconductor film;

a first contact hole formed in said insulating film;

a wiring formed on said insulating film and electrically connected to said semiconductor film through said first contact hole formed in said insulating film;

a leveling film comprising an organic resin to provide a leveled upper surface over said semiconductor film;

a second contact hole through said leveling film and said insulating film; and

a pixel electrode formed over said leveled upper surface and directly contacting said semiconductor film through said second contact hole.

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61. (Twice Amended) A television having a display unit and a tuner for receiving television radio wave, said display unit comprising:

at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof;

an insulating film comprising an inorganic material formed over said semiconductor film;

a first contact hole in said insulating film;

a wiring formed on said insulating film and electrically connected to said semiconductor film through said first contact hole formed in said insulating film;

a leveling film comprising an organic resin to provide a leveled upper surface over said semiconductor film;

a second contact hole through said leveling film and said insulating film; and

a pixel electrode formed over said leveled upper surface and directly connected to said semiconductor film through said second contact hole,

wherein an edge of said leveling film at a periphery of said second contact hole is rounded

wherein a surface of said pixel electrode is conformal to the rounded edge of said leveling film at said second contact hole

62. (Twice Amended) A television having a display unit and a tuner for receiving television radio wave, said display unit comprising:

at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof and a gate electrode adjacent to said semiconductor film with a gate insulating film interposed therebetween;

an insulating film comprising an inorganic material formed over said semiconductor film;

a wiring formed on said insulating film and electrically connected to said semiconductor film through a contact hole formed in said insulating film;

a leveling film comprising an organic resin provided over said semiconductor film, said insulating film and said wiring;

an opening through said leveling film and said insulating film; and

a pixel electrode formed over said leveling film and directly connected to said semiconductor film through said opening,

wherein a diameter of said opening is larger at an uppermost surface of said leveling film than at a lowermost surface thereof.

63. (Twice Amended) A television having a display unit and a tuner for receiving television radio wave, said display unit comprising:

at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof;

an insulating film over said semiconductor film, said insulating film comprising an inorganic material;

a leveling film comprising an organic resin formed over said insulating film;

and

a pixel electrode formed over said leveling film and directly connected to said semiconductor film through an opening provided in said leveling film,

wherein an edge of said organic resin film at a periphery of said opening is rounded,

wherein a surface of said pixel electrode is conformal to the rounded edge of said leveling film at said opening

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cont.

64. (Twice Amended) A television having a display unit and a tuner for receiving television radio wave, said display unit comprising:

a plurality of thin film transistors formed over a substrate, each of said thin film transistors comprising at least a semiconductor film and a gate electrode adjacent to said semiconductor film with a gate insulating film interposed therebetween;

an insulating film formed over said semiconductor film, said insulating film comprising an inorganic material;

a first opening formed in said insulating film over said semiconductor film;

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a leveling layer formed over said insulating film to provide a leveled upper surface, wherein said leveling layer comprises an organic resin and is prevented from directly contacting said semiconductor film by said insulating film;

a second opening through said leveling layer and said insulating film over said semiconductor film; and

a pixel electrode formed over said leveled upper surface, said pixel electrode being directly connected to said semiconductor film through said second opening.

65. (Twice Amended) A television having a display unit and a tuner for receiving television radio wave, said display unit comprising:

at least one thin film transistor formed over a substrate, said thin film transistor having a semiconductor film comprising silicon as an active layer thereof and a gate electrode adjacent to said semiconductor film with a gate insulating film interposed therebetween;

an insulating film comprising an inorganic material formed over said semiconductor film;

a first contact hole formed in said insulating film;

a wiring formed on said insulating film and electrically connected to said semiconductor film through said first contact hole formed in said insulating film;

a leveling film comprising an organic resin to provide a leveled upper surface over said semiconductor film;

a second opening through said leveling film and said insulating film; and

a pixel electrode formed over said leveled upper surface and directly contacting said semiconductor film through said second opening.